

10/583114
Case 10051(2)

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Claims

1. A process for the conditioning of liquefied natural gas, which comprises applying the following steps to a feed stream of liquefied natural gas:
 - i. vaporizing at least a major portion of the feed stream of liquefied natural gas to produce an at least partially vaporized natural gas stream;
 - 5 ii. separating the at least partially vaporized natural gas stream to produce a first stream which is rich in methane and a second stream which is rich in hydrocarbons having two or more carbon atoms;
 - iii. if required, compressing the first stream from step (ii) to increase the pressure and produce a compressed gas stream;
 - 10 iv. cooling the compressed gas stream from step (ii) or (iii) by heat exchange with at least part of the feed stream of liquefied natural gas to produce a liquid compressed gas stream;
 - v. passing the second stream from step (ii) without pumping to a distillation vessel to produce a natural gas liquids stream and a stream rich in methane,
 - 15 vi. the operating pressure of the distillation vessel being such that the stream rich in methane exits the distillation vessel at a pressure in the range of from 2 to 6 barg;
 - vii. cooling the stream rich in methane from step (v) by heat exchange with at least part of the feed stream of liquefied natural gas and subsequently pumping to produce a liquid compressed gas stream;
 - 20 viii. optionally combining the liquid compressed gas streams from steps (ii) or (iii) and (vi);
 - viii. vaporizing the liquid compressed gas streams from steps (iv), (vi) and/or (vii) to

ix. produce a conditioned natural gas; and

5 x. recovering the natural gas liquids
wherein at least a major portion of the feed stream of liquefied natural gas is vaporized in step (i) by heat exchange of at least part of the feed stream of liquefied natural gas with the compressed gas stream from step (ii) or (iii) and with the stream rich in methane from step (v).

10 2. A process as claimed in claim 1, in which in step (v) the stream rich in methane exits the distillation vessel at a pressure in the range of from 3 to 5 barg.

3. A process as claimed in either claim 1 or claim 2, in which the separation of step (ii) is carried out using a separator with no reflux streams and containing no packing materials or gas-liquid separation trays.

15 4. A process as claimed in any one of claims 1 to 3, in which the distillation column used in step (v) contains gas-liquid separation packing or trays and is operated without the presence of a reflux stream.

5. A process as claimed in any one of claims 1 to 4, in which in excess of 90% of the feed stream to the process is processed in step (i), none of said feed stream being used to act as a reflux in any column used in the process.

20 6. A process as claimed in any one of claims 1 to 5, in which the stream rich in methane from step (v) is cooled by heat exchange with at least part of the feed stream of liquefied natural gas and is subsequently pumped to equalise its pressure with that of the liquid compressed gas stream produced in step (iv), and the two streams are combined.

25 7. A process as claimed in claim 6, in which said combined stream is pumped to increase the pressure and subsequently vaporized.

8. A process as claimed in any one of claims 1 to 7, in which the distillation vessel in step (ii) is provided with a reboiler which uses seawater as coolant.

30 9. A process as claimed in any one of claims 1 to 8, in which the input pressure of the at-least partially vaporized natural gas stream into step (ii) is in the range of from 9 to 13 barg.

5 10. A process as claimed in claim 9, in which the pressure of the compressed gas stream produced in step (iii) is increased by from 2 to 5 bar.

11. A process as claimed in claims 9 or 10, in which the liquid compressed gas stream from step (iv) is at a pressure of 12 to 16 barg.

12. A process according to any one of claims 1 to 11, in which the temperature of
10 the seed stream of liquefied natural gas is in the range of from -170 to -150°C.

13. A process as claimed in any one of claims 1 to 12, in which the heat exchanger(s) used in steps (ii)/(iii) and (v) is/are a plate-fin exchanger(s).

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